

ELECTRONIC TUBE REFERENCE

17CDP4

Specialized - Cathode Ray electronic tube

CONSOLIDATED TECHNICAL DATA

1 SECTION
CONSTRUCTION
CATHODERAY

Seventeen-inch aluminized direct-view television picture tube with electrostatic focusing, magnetic deflection, and an external ion-trap arrangement. Its unipotential electron gun and high-voltage anode system are designed for monochrome receiver display.

GENERAL CHARACTERISTICS

BASE DESIGNATION	—	BASE PINS	—
NOMINAL HEATER	8.4 V / 450 mA	PARALLEL HEATER	— / —
HEATING	Indirect	SERIES OPERATION	Not specified
CATHODE ARRANGEMENT	Separate cathodes	SECTION CONSTRUCTION	Similar

SECTION RATINGS

SECTION1 Cathode Ray	
MAXIMUM SCREEN VOLTAGE	500 V
Source-derived section; promoted fields populated where applicable.	

17CDP4 — Electrostatic-Focus Magnetic-Deflection Cathode Ray Tube

The **17CDP4** is a very short, direct-view rectangular glass picture tube designed for television receiver applications. It features low-voltage electrostatic focusing and wide-angle magnetic deflection. The tube incorporates an aluminized screen with a white-emitting phosphor, a neutral gray filterglass faceplate to enhance picture contrast, and an external conductive bulb coating that serves as a supplementary high-voltage filter capacitor when grounded.

The electron gun is a straight-type design that does not require an ion-trap magnet. The 17CDP4 is designed with a controlled heater warm-up time, making it suitable for use in television receivers employing series-connected heater strings.

Physical and Optical Construction

The 17CDP4 is housed in a rectangular glass envelope designated as bulb number J132-1/2. It has a nominal neck diameter of 1-1/8 inches and a neck length of $5\text{-}7/16 \pm 1/8$ inches. The physical dimensions of the bulb are:

- **Overall Length:** $12\text{-}9/16 \pm 1/4$ inches
- **Greatest Diagonal:** $16\text{-}9/16 \pm 1/8$ inches
- **Greatest Width:** $15\text{-}5/8 \pm 1/8$ inches
- **Greatest Height:** $12\text{-}3/4 \pm 1/8$ inches

The screen itself provides a minimum useful projected area of 155 square inches, with the following minimum dimensions:

- **Diagonal:** 15-3/4 inches
- **Width:** 14-3/4 inches
- **Height:** 11-11/16 inches

Optical Characteristics

The screen utilizes a P-4 sulfide-type phosphor, which exhibits white fluorescence and phosphorescence with a short persistence. The faceplate is a spherical neutral gray filterglass with an approximate light transmission of 78% at the center, which reduces ambient light reflections and improves contrast.

Deflection and Focusing

The tube utilizes magnetic deflection with wide deflection angles to minimize overall length:

- **Diagonal Deflection Angle:** 110°
- **Horizontal Deflection Angle:** 105°
- **Vertical Deflection Angle:** 87°

Focusing is achieved electrostatically via Grid No. 4, which operates at low voltages relative to the high-voltage anode.

Heater and Electrical Connections

The 17CDP4 is equipped with a unipotential cathode and a heater designed for either AC or DC operation. The heater has a controlled warm-up characteristic to ensure reliable operation in series-string heater circuits.

Heater Ratings

- **Heater Voltage:** 8.4 V
- **Heater Current:** 0.45 A
- **Warm-up Time:** Approximately 11.0 seconds

Pinout and Basing

The tube uses a Small-Button Eightar 7-Pin base (Style B, JETEC No. B7-183) with an indexing plug, designated as basing configuration **8HR**. High-voltage connection to the anode (comprising Grid No. 3, Grid No. 5, and the internal collector) is made via a recessed small cavity cap (JETEC No. J1-21) located on the bulb cone. The anode cap aligns with pin position No. 4 within a tolerance of ± 30 degrees.

The pin connections, viewed from the bottom of the base, are as follows:

Pin	Connection
Pin 1	Heater
Pin 2	Grid No. 1 (Control Grid)
Pin 3	Grid No. 2 (Screen Grid)
Pin 4	Grid No. 4 (Focusing Electrode)
Pin 6	Grid No. 1 (Control Grid)
Pin 7	Cathode
Pin 8	Heater
Cap	Anode (Grid No. 3, Grid No. 5, Collector)

Interelectrode Capacitances

- **Grid No. 1 to all other electrodes:** 6 μpF
- **Cathode to all other electrodes:** 5 μpF
- **External conductive coating to anode:** 800 μpF minimum, 1500 μpF maximum

The external conductive coating must be grounded to the receiver chassis to form a low-inductance, high-voltage filter capacitor in conjunction with the internal conductive coating.

Operating Modes and Electrical Characteristics

The 17CDP4 can be operated in either **Grid-Drive Service** (where the video signal is applied to Grid No. 1, varying its potential with respect to the cathode) or **Cathode-Drive Service** (where the video signal is applied to the cathode, varying its potential with respect to Grid No. 1).

Typical Operating Conditions

The following table outlines the typical operating parameters for both drive methods:

Parameter	Grid-Drive Service	Cathode-Drive Service
Anode (Ultor) Voltage	14,000 V / 16,000 V	14,000 V / 16,000 V

Parameter	Grid-Drive Service	Cathode-Drive Service
Grid No. 2 Voltage	300 V / 400 V	—
Grid No. 2-to-Grid No. 1 Voltage	—	300 V / 400 V
Grid No. 4 (Focus) Voltage	0 to 400 V / 0 to 400 V	—
Grid No. 4-to-Grid No. 1 Voltage	—	0 to 400 V / 0 to 400 V
Grid No. 1 Cutoff Voltage	-28 to -72 V / -36 to -94 V	—
Cathode-to-Grid No. 1 Cutoff Voltage	—	28 to 60 V / 36 to 78 V
White-Level Video Drive (Peak)	28 to 72 V / 36 to 94 V	-28 to -60 V / -36 to -78 V

Under typical operating conditions, the focusing electrode (Grid No. 4) current ranges from -25 to +25 μ A, and the screen grid (Grid No. 2) current ranges from -15 to +15 μ A. A centering magnet with a field strength of 0 to 8 gaussess may be used for raster alignment.

Qualitative Performance Characteristics

The raster-cutoff voltage boundaries scale linearly with the applied Grid No. 2 (or Grid No. 2-to-Grid No. 1) voltage. Both anode current and highlight brightness increase exponentially as the video drive signal increases from the raster-cutoff point. For example, at a video drive of approximately 80 V from cutoff, the anode current can reach approximately 2.5 mA, producing a highlight brightness of about 700 foot-lamberts.

Maximum Ratings and Circuit Design Constraints

The 17CDP4 is rated under the Design-Center system. Operating the tube beyond these limits can impair performance or cause permanent damage.

Design-Center Maximum Ratings

Rating Parameter	Grid-Drive Service	Cathode-Drive Service
Maximum Anode Voltage	16,000 V	16,000 V
Minimum Anode Voltage	12,000 V	12,000 V
Grid No. 4 Voltage	-500 to +1000 V	—
Grid No. 4-to-Grid No. 1 Voltage	—	-500 to +1000 V
Grid No. 2 Voltage	500 V	—
Grid No. 2-to-Grid No. 1 Voltage	—	640 V

Rating Parameter	Grid-Drive Service	Cathode-Drive Service
Grid No. 2-to-Cathode Voltage	—	500 V
Grid No. 1 Negative-Bias Voltage	140 V	—
Grid No. 1 Negative-Peak Voltage	200 V	—
Grid No. 1 Positive-Bias Voltage	0 V	—
Grid No. 1 Positive-Peak Voltage	2 V	—
Cathode-to-Grid No. 1 Positive-Bias Voltage	—	140 V
Cathode-to-Grid No. 1 Positive-Peak Voltage	—	200 V
Cathode-to-Grid No. 1 Negative-Bias Voltage	—	0 V
Cathode-to-Grid No. 1 Negative-Peak Voltage	—	2 V
Peak Heater-Cathode Voltage (Heater Neg. or Pos.)	180 V	180 V

Circuit Resistance Limits

- **Maximum Grid No. 1 Circuit Resistance:** 1.5 MΩ
- **Minimum Grid No. 2 Circuit Resistance:** 0.1 MΩ
- **Minimum Grid No. 4 Circuit Resistance:** 0.1 MΩ

The inclusion of a minimum 0.1 MΩ protective resistor in both the Grid No. 2 and Grid No. 4 focusing electrode circuits is highly recommended to safeguard the tube against momentary internal arcs.

Safety and Shielding

The 17CDP4 is capable of operating at voltages up to an absolute maximum of 17.6 kilovolts. When operated at voltages exceeding 16 kilovolts, the tube may produce X-rays, necessitating the installation of adequate shielding in the receiver cabinet to protect users from exposure.

Technical Summary

The **17CDP4** is a compact, 110° magnetic-deflection cathode ray tube featuring low-voltage electrostatic focusing and a straight electron gun that eliminates the need for an ion trap. With an 8.4 V, 0.45 A controlled-warmup heater, it is optimized for series-string television chassis. The tube provides a 155-

square-inch viewing area on an aluminized P-4 screen behind a 78% transmission neutral gray faceplate. It supports both grid-drive and cathode-drive configurations, operating typically at anode potentials of 14,000 to 16,000 V, and requires proper grounding of its external conductive coating to utilize its integrated filter capacitance.

SOURCE OPERATING CONDITIONS

[SOURCE PDF](#)

1940 RCA

Published test conditions and operating points. Values on this page are preserved as reported by this source.

1940 RCA

Section 1 · Cathode Ray

OTHER		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Low-Voltage Electro-Aluminized Screen I4	16	Low-Voltage Electro- Aluminized Screen I4-3/4" x 11-11/16" Screen
i1	16	i10° Magnetic Deflection for Series Heater-String Operation 12-13/16" Max. Length
type. It has a spherical Filterglass faceplate, power than is required to scan a tube with	90	type. It has a spherical Filterglass faceplate, power than is required to scan a tube with 90°
minimum projected screen area of	155	minimum projected screen area of 155 square inches. "straight"
voltage (AC or DC)	8.4 V	voltage (AC or DC) 8.4 volts
Current. e e e e e e e e	450 mA	Current. e e e e e e e e 0.45 amp
in the test circuit shown in Fig	1	in the test circuit shown in Fig.1 for the voltage
zero to	6.9 V	zero to 6.9 volts.
The I7CDP4 utilizes an	450 V	The I7CDP4 utilizes an 8.4-volt, 450 mitli-Phosphorescence. white
	105	10°—diagonal deflection angle, Horizontal 105°
the	87	the 17CDP4 has a very short length—a length approx— vertical 87°
size faceplate and	8	size faceplate and 90° deflection. As a result, Greatest width . 15-5/8" ϕ 1/8"
Diagonal	1	Diagonal 15-3/4" CATHODE-TO-GRID —No.1 VOLTAGE:
Projected area « + .+«	200 V	Projected area « + .+« 4 . o0 155 sqg. in. Positive peak value. 200 max. volts

PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
to cathode	15 V	to cathode . . . - .. 180 max. volts Grid-No.2 Current. .. -15 to +15 pamp
Withany ultor voltage (Ec5k) between	16000 V	Withany ultor voltage (Ec5k) between 12000 and 16000 volts
and grid-No	2	and grid-No.2 voltage (E02k) between
200 and 500 volts Examples of Use of Design Ranges:	500 V	200 and 500 volts Examples of Use of Design Ranges:
Grid-No.dz Voltage for No.1 voltage of	16000 V	Grid-No.dz Voltage for No.1 voltage of 14000 16000 volts
Focus	2 V	Focus 0 to 400 volts and %rzd-No.2-to-grid-
Grid-No	400 V	Grid-No.1 Vo]tage (Ecik) 0.1 voltage of 300 400 volts
of Focused Raster. See Raster-Cutoff-Range Chart No	1	of Focused Raster. See Raster-Cutoff-Range Chart No.1 voltage
for Grid-Drive Service for Focus	0 V	for Grid-Drive Service for Focus. 0 to 400 0 tou00 volts
White-level value Focused Raster	78 V	White-level value Focused Raster 28 to 60 36 to 78 volts
Grid-No	25	Grid-No.4 Current, -25 to +25 pamp Raster Cutoff
Grid-No	78	Grid-No.2 Current. .. -15 to +15 pamp white-level value. ~28 to-60 -36to-78 voltis
Grid-No	1.5	Grid-No.1-Circuit Resistance 1.5 max. megohms
With ultor voltage of	16000 V	With ultor voltage of 14000 16000 volts
and grid-¥o	400 V	and grid-¥o.2 voltage of 300 400 volts
Grid-No	4	Grid-No. 4 Voltage for which is applied the highestdc voltage for accelerating
Focus	0 V	Focus. . 0 tou00 0to 00 volts the electrons in the beam prior to its deflection. In
of Focused Raster	17 V	of Focused Raster. -28to—72 -36to-94 volts together within the 17CDP4, they are collectively
white-level value	1 V	white-level value. 28 to 72 36 to 9u volts signal varies the grid-No.1 potential with respect to
§ The grid-No	1	§ The grid-No.4 voltage or grid-No.d-to-grid-No.1 voltage
CATHODE-DRIVE™ SERVICE for values of ultor voltage (or ultor-to-grid-No	1	CATHODE-DRIVE™ SERVICE for values of ultor voltage (or ultor-to-grid-No.1

PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
voltage grid-No	1	voltage grid-No.2 voltage (or grid-No.2-to-grid-No.1
ULTOR®-T0-GRID-No	16	ULTOR®-TO-GRID-No.1 VOLTAGE. . {igggg max. volts fall within a circle having 5/16=inch radius concentric
GRID-No.¥	1	GRID-No.¥4-TO-GRID-No.1 VOLTAGE:
1/2-inch deflection of the spot from the center of the	2	1/2-inch deflection of the spot from the center of the
Positive value	1000 V	Positive value 1000 max. volts tube face.
Negative value . . . e e	500 V	Negative value . . . e e 500 max. volts
GRID-No	640 V	GRID-No.2-TO-GRID-No. 1 VOLTAGE e e 640 max. volts video signal varies the cathode potential with respect
GRID-No	1 V	GRID-No.2-T0-CATHODE VOLTAGE 500 max. volts to grid No.1 and the other electrodes.



SOURCE DATA APPENDIX

SOURCE OPERATING CONDITIONS

[SOURCE PDF](#)

1961 Tung Sol

Published test conditions and operating points. Values on this page are preserved as reported by this source.

1961 TUNG SOL

Section 1 · Cathode Ray

OTHER		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Heater voltage	8.4 V	Nominal
Heater current	450 mA	Nominal
Anode voltage	16 V	Published CRT operating condition
Grid 2 voltage	500 V	Published CRT operating condition



SOURCE DATA APPENDIX

1965 Sylvania Electronic Tubes Vol3

Published test conditions and operating points. Values on this page are preserved as reported by this source.

1965 SYLVANIA ELECTRONIC TUBES VOL3

Section 1 · Cathode Ray

CHARACTERISTICS		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Focusing method	1 code	LowVoltageElectrostatic
Deflection method	1 code	Magnetic
Deflection angle	110 deg	—

OTHER		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Anode voltage maximum	16000 V	—
Anode voltage	14000 V	—
Grid No. 2 voltage maximum	500 V	—
Grid No. 4 focusing voltage minimum	0 V	—
Grid No. 4 focusing voltage maximum	400 V	—



SOURCE DATA APPENDIX

SOURCE PDF

1966 Tung Sol Electronic Tubes 4 of 4

Published test conditions and operating points. Values on this page are preserved as reported by this source.

1966 TUNG SOL ELECTRONIC TUBES 4 OF 4

Section 1 · Cathode Ray

OTHER		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Maximum Grid No. 2 voltage	500 V	Published maximum Grid No. 2 voltage
FACEPLATE TRANSMISSION AT CENTER (A PPR OX.)	78 %	FACEPLATE TRANSMISSION AT CENTER (A PPR OX.): 78 PERCENT

PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
HEATER VOLTAGE	8.4 V	HEATER VOLTAGE 8.4 VOLTS
HEATER CURRENT	450 mA	HEATER CURRENT 0.45 AMP.
MAXIMUM DC ANODE VOLTAGE	16000 V	MAXIMUM DC ANODE VOLTAGE 16 000 VOLTS
MAXIMUM DC GRID #2 VOLTAGE	500 V	MAXIMUM DC GRID #2 VOLTAGE 500 voLTs
HEATER NEGATIVE WITH RESPECT TO CATHODE IS	0 V	HEATER NEGATIVE WITH RESPECT TO CATHODE ISO VOLTS
HEATER POSITIVE WITH RE.S PECT TO CATHODE	180 V	HEATER POSITIVE WITH RE.S PECT TO CATHODE 180 voLTs
MAXIMUM GRID #1 CIRCUIT RESISTANCE	1.5 Mohm	MAXIMUM GRID #1 CIRCUIT RESISTANCE 1.5 MEGOHMS
HEATER VOLTA 6E S	4 V	HEATER VOLTA 6E S.4 VOLTS
HEATER CURRENT	45 A	HEATER CURRENT 0,45 AMP.
MAXIMUM DC GRID k4 VOLTAGE -500 70 +	1000 V	MAXIMUM DC GRID k4 VOLTAGE -500 70 +1000 VOLTS
HEATER NEGATIVE WITH RESPECT TO CATHODE j\$	0 V	HEATER NEGATIVE WITH RESPECT TO CATHODE j\$0 VOLTS
HEATER POSITIVE WITH RESPECT TO CATHODE 1H	0 V	HEATER POSITIVE WITH RESPECT TO CATHODE 1H0 VOLTS
MAXIMUM GRID #2 TO GRID #i VOLTAGE	640 V	MAXIMUM GRID #2 TO GRID #i VOLTAGE 640 VOLTS
MAXIMUM GRID #2 TO CATHODE VOLTAGE	500 V	MAXIMUM GRID #2 TO CATHODE VOLTAGE 500 VOLTS
UC ANODE VOLTAGE j	4000 V	UC ANODE VOLTAGE j4 000 VOLTS
OC GRID #q VOLTAGE 0 TO !iC	0 V	OC GRID #q VOLTAGE 0 TO !iC0 VOLTS
DC GRID #1 VOLTAGE C -2F3 TO -%	2 V	DC GRID #1 VOLTAGE C -2F3 TO -%2 VOLTS
DC GRID #2 VOLTAGE	300 V	DC GRID #2 VOLTAGE 300 VOLTS
DC GRID #i VOL7AGE C 28 r	60 V	DC GRID #i VOL7AGE C 28 ro 60 voLTs.

CHARACTERISTIC		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
CATHODE TO ALL OTHER ELECTRODES	5 MMF	CATHODE TO ALL OTHER ELECTRODES 5 µmf
GRID #1 TO ALL OTHER ELECTRODES	6 MMF	GRID #1 TO ALL OTHER ELECTRODES 6 µmf
MAXIMUM EXTERNAL CONDUCTIVE COATING TO ANODE	1500 MMF	MAXIMUM EXTERNAL CONDUCTIVE COATING TO ANODE 1500 µmf

PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
MINIMUM EXTERNAL CONDUCTIVE COATING TO ANODE	800 MMF	MINIMUM EXTERNAL CONDUCTIVE COATING TO ANODE 800 μf

TUBE TINKER

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